REMARKS

Claims 1-7, 9-13 and 23 are pending in the present application.

Claim 1 was objected to because of an informality: "though" should be changed to "through".

Claims 1-4, 6, 7, 9, 10 and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Barnes, U.S. Patent No. 4,795,547 ("Barnes").

Claims 1-6, 9-11 and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirsch, U.S. Patent No. 4,789,580 ("Hirsch") in view of Hiltunen et al., U.S. Patent No. 5,505,907 ("Hiltunen").

Claim 7 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirsch in view of Hiltunen and further in view of Rammler, U.S. Patent No. 3,884,620 ("Rammler").

Claims 12 and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirsch in view of Hiltunen and further in view of Schmidt, U.S. Patent No. 6,015,539 ("Schmidt").

Claim 1 has now been amended. Claim 5 has now been cancelled without prejudice. No new matter has been added. Reconsideration of the application in view of the amendment and following remarks is respectfully requested.

Objection to Claim 1

Claim 1 was objected to because of an informality: "though" should be changed to "through".

The Applicants have now amended claim 1 to recite "through".

Withdrawal of the objection to claim 1 is respectfully requested.

Rejection of Claims 1-4, 6, 7, 9, 10 and 23 under 35 U.S.C. § 103(a)

Claims 1-4, 6, 7, 9, 10 and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Barnes, U.S. Patent No. 4,795,547 ("Barnes").

Independent claim 1 of the present application has now been amended so as to recite a method for the heat treatment of fine-grained solids "wherein the bed height of the solids in the reactor is adjusted such that the annular fluidized bed extends beyond the upper orifice end of the gas supply tube." Support for this amendment can be found in the Specification, for example, on page 4, line 23 to page 5, line 2. Independent claim 1 has thereby been amended to include the limitations of dependant claim 5, which has now been cancelled. The Examiner had previously indicated in the Office Action dated October 30, 2008 that dependant claim 5 was allowable. The Examiner stated in the present Office Action at page 7 that dependant claim 5 had not been incorporated into independent claim 1 as had been indicated by the Applicant. Applicants have now so incorporated claim 5 into claim 1.

It is respectfully submitted that Barnes does not teach or suggest adjusting the bed height of the solids in the reactor such that the annular fluidized bed extends beyond the upper orifice end of the gas supply tube as now recited in claim 1. In contrast, Barnes describes neither an annular fluidized bed nor any adjustment of a bed height. In fact, Barnes does not even teach a gas supply tube but rather an annular inlet opening 6 and tubular inlet means 5 for a first and second fluid, which fluids can be mixed with a gas introduced via inlet means 27. See Barnes, column 2, lines 8-19 and column 3, lines 7-10.

Because Barnes is missing the aforementioned recited limitation of claim 1, it is respectfully submitted that Barnes alone could not render claim 1, or any of its dependant claims, obvious.

For the above reasons, reconsideration and withdrawal of the rejection to claims 1-4 and 6-13 under 35 U.S.C. § 103(a) based on Barnes is respectfully requested.

Rejection of Claims 1-7, 9-13 and 23 under 35 U.S.C. § 103(a)

Claims 1-6, 9-11 and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirsch, U.S. Patent No. 4,789,580 ("Hirsch") in view of Hiltunen et al., U.S. Patent No. 5,505,907 ("Hiltunen"). Claim 7 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirsch in view of Hiltunen and further in view of Rammler, U.S. Patent No. 3,884,620 ("Rammler"). Claims 12 and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirsch in view of Hiltunen and further in view of Schmidt, U.S. Patent No. 6,015,539 ("Schmidt").

Hirsch describes a process for a direct reduction of iron oxide containing materials using a conventional fluidized 22 bed with a recirculation 42 of hot reducing gas. See Hirsch, column 8, lines 2-11, and Fig. 1.

Hiltunen describes a method and apparatus for cooling hot gas in a reactor. Hiltunen describes a reactor 10 where the lower section is provided with a hot gas inlet 16 and a chamber encompassing a fluidized bed 14, the middle section is provided with a riser 22, and the upper section with a cooled gas outlet 30. Heat is transferred from the hot gas to solid particles inlet top edges 18. Heat is recovered from the solid particles at the cooling panels 24 and at transfer surfaces 46 and 44. Two conduits 54 and 56 regulate the volume of the particles. See Hiltunen, column 1, lines 39-61, and Fig. 1.

Rammler describes an apparatus for continuously heating fine-grained coal including a plurality of heat exchange cyclones for preheating the coal positioned on different levels, a fluidized bed heater positioned below the heat exchange cyclones and means to transfer exhaust gas from the fluidized bed heater to the heat exchange cyclones. See Rammler, the Abstract and Fig. 1.

Schmidt describes a process of producing cement clinker comprising preheating the raw cement powder in a suspension-type heat exchanger, de-acidifying in a precalcining system, clinkering in a fluidized bed, and subsequently cooling the clinker. See Schmidt, column 1, lines 6-10.

Independent claim 1 of the present application recites "adjusting the gas velocities of the first gas or gas mixture as well as of the fluidizing gas for the annular fluidized bed such that the

particle Froude numbers in the gas supply tube are between 1 and 100, in the annular fluidized bed between 0.02 and 2 and in the mixing chamber between 0.3 and 30."

It is respectfully submitted that neither Hirsch nor Hiltunen teach or suggest adjusting the gas velocities such that the particle Froude numbers in the gas supply tube are between 1 and 100, in the annular fluidized bed between 0.02 and 2 and in the mixing chamber between 0.3 and 30, as recited in claim 1. In contrast, Hirsch merely describes a typical Froude number range for a circulating fluidized bed reactor that may define overall reactor operating conditions. See Hirsch, column 3, lines 23-45. Hirsch nowhere teaches establishing differing Froude ranges in different portions of the chamber of an annular fluidized bed reactor, i.e., the gas supply line, annular fluidized bed and mixing chamber, as recited in claim 1. Nor does Hirsch teach the combination of Froude number ranges recited in claim 1. Regarding Hiltunen, that reference does not teach Froude numbers at all. Nor could Froude numbers have been defined for the inhomogeneous flow conditions in the Hiltunen reactor. In Hiltunen, particles flowing back to the fluidized bed release heat to the cooled walls 24 of the riser 22. See Hiltunen, column 4, lines 47-50, and Fig. 1. Local cooling of the suspension in the riser 22 leads to increased local densities and decreased volume flow. The particles close to the wall therefore sink down as is indicated in Hiltunen by the arrows in Figs. 1-3; i.e., the downward arrows next to wall 24. The flow characteristics in the Hiltunen reactor are therefore achieved through flow directions caused by the temperature profile of the reactor. Such flow directions can only be realized if relatively high temperature gradients exist in the reactor, unlike the conditions in the stationary annular fluidized bed recited in claim 1 of the present application. See Hiltunen, column 3, lines 10-13, and column 4, lines 39-40. Due to the inhomogeneous flow environment, the process conditions in the Hiltunen reactor cannot be characterized by certain particle Froude numbers. A person of ordinary skill in the art would therefore not have attempted to apply Froude numbers to control the reactor of Hiltunen.

Because each of Hirsch and Hiltunen are missing at least the recited differing Froude ranges feature recited in claim 1, it is respectfully submitted that any combination of Hirsch and Hiltunen, to the extent proper, could not render claim 1 or any of its dependent claims obvious.

It is respectfully submitted that claims 7, 12 and 13 each properly depend on claim 1. As stated above, none of Hirsch or Hiltunen teach or suggest at least the feature of adjusting the gas velocities of the first gas or gas mixture as well as of the fluidizing gas for the annular fluidized bed such that the particle Froude numbers in the gas supply tube are between 1 and 100, in the annular fluidized bed between 0.02 and 2 and in the mixing chamber between 0.3 and 30. None of Rammler and Schmidt cure this defect. Therefore, a combination of Hirsch, Hiltunen, Rammler and Schmidt, to the extent proper, could not render claim 1, or any of its dependant claims, obvious.

For the above reasons, reconsideration and withdrawal of the rejections to claims 1-7, 9-13 and 23 under 35 U.S.C. § 103(a) based on Hirsch, Hiltunen, Rammler and Schmidt is respectfully requested.

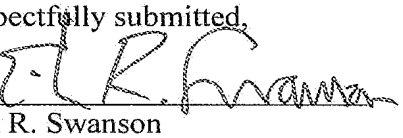
CONCLUSION

In view of the above amendment, Applicants believe the pending application is in condition for allowance.

The Commissioner is hereby authorized to charge any unpaid fees deemed required in connection with this submission, including any additional filing or application processing fees required under 37 C.F.R. §1.16 or 1.17, or to credit any overpayment, to Deposit Account No. 04-0100.

Dated: August 17, 2009

Respectfully submitted,

By 

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